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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/579,903

11/15/2006

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EXAMINER

CARTER, MICHAEL W

ART UNIT

PAPER NUMBER

2828

MAIL DATE

DELIVERY MODE

12/01/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/579,903	<b>Applicant(s)</b> TANAKA ET AL.	
	<b>Examiner</b> MICHAEL CARTER	<b>Art Unit</b> 2828	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

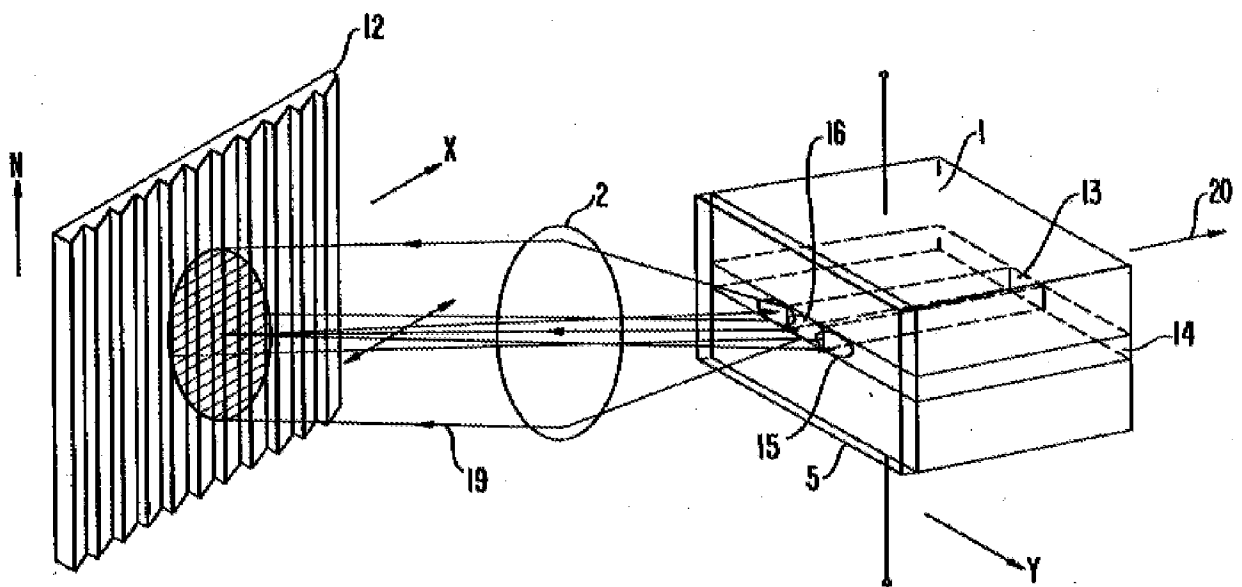
### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

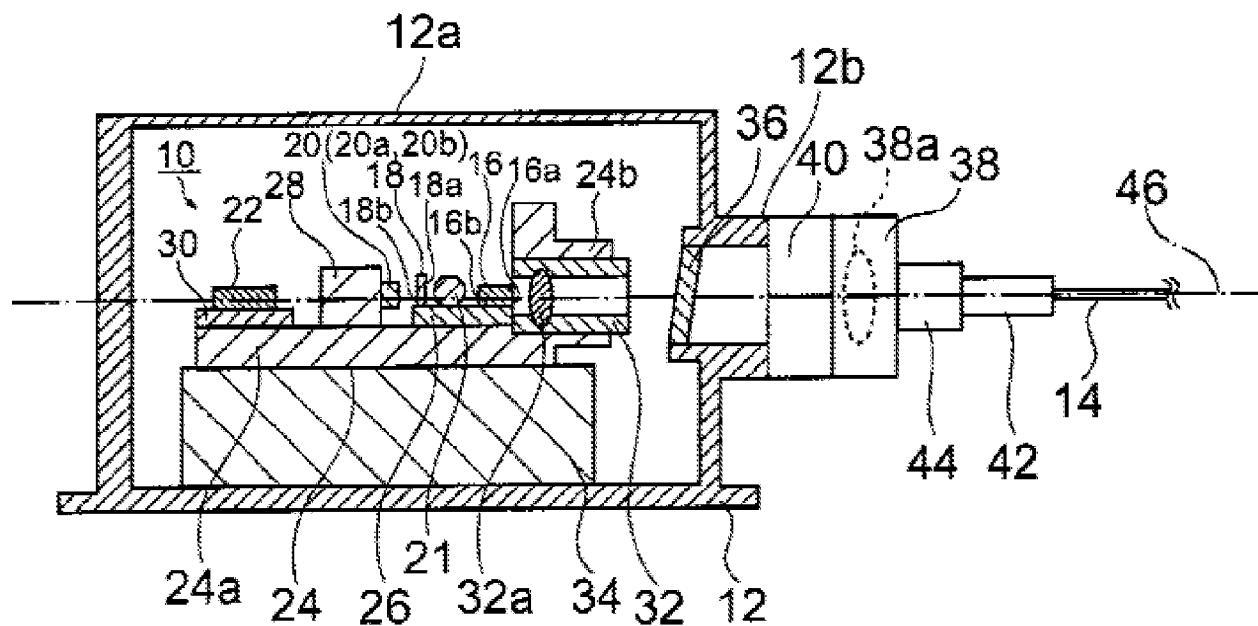
## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. **Claims 1-4 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Asakura et al., US Patent 4,913,525 (hereinafter referred to as Asakura), in view of Kato et al., US Patent 6,488,419 (hereinafter referred to as Kato) and further in view of Verdiell et al., US Patent 5,870,417 (hereinafter referred to as Verdiell).



Asakura, figure 2



**Kato, figure 2**

3. **For claim 1**, Asakura teaches, an external cavity type semiconductor laser, comprising: a laser diode having a plurality of layers including an activation layer (figure 2, label 14); a grating that receives a beam emitted from the laser diode and returns a beam having a predetermined wavelength to the laser diode (figure 2, label 12 or figure 4, label 3); and a lens disposed between the laser diode and the grating and which collects the beam emitted from the laser diode (figure 2, label 2).
4. Asakura does not teach a window glass disposed opposite to a beam emission surface of the laser diode; wherein the window glass is arranged in a first state or a second state, in the first state the window glass is in parallel with a first axis nearly perpendicular to a surface that is in parallel with at least one of boundary surfaces of the activation layer and other layers of the laser diode, the window glass being nearly in parallel with at least one of the boundary surfaces of the activation layer and the other

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layers of the laser diode, the window glass being nearly in parallel with the beam emission surface of the laser diode, the window glass being not in parallel with a second axis perpendicular to the first axis, and in the second state the window glass is not in parallel with the first axis, the window glass being nearly in parallel with the second axis.

5. However, Kato does teach a window glass (figure 2, label 36) disposed opposite to a beam emission surface of the laser diode (end face 16a); wherein the window glass is arranged in a first state or a second state, in the first state the window glass is in parallel with a first axis nearly perpendicular to a surface that is in parallel with at least one of boundary surfaces of the activation layer and other layers of the laser diode, the window glass being nearly in parallel with at least one of the boundary surfaces of the activation layer and the other layers of the laser diode, the window glass being nearly in parallel with the beam emission surface of the laser diode, the window glass being not in parallel with a second axis perpendicular to the first axis, in the second state the window glass is not in parallel with the first axis, the window glass being nearly in parallel with the second axis (figure 2, label 36 is in the second state which corresponds to figure 7b of the application) in order to hermetically seal the laser while allowing light out of the sealed enclosure (column 7, lines 66-67).

6. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use Kato's window with Asakura's laser by placing the window such that the grating receives a beam from the laser through the window and returned to the laser in order to hermetically seal the laser while still allowing light to interact with the grating.

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7. Asakura further teaches using an AR coating (figure 2, label 5).
8. The combination does not teach a reflectance of a beam emission surface of the laser diode is 3% or less for light received from outside the laser diode.
9. However, Verdiell does teach using an AR coating with 1% reflectance in order to suppress self oscillation (column 4, lines 14-16).
10. It would have been obvious to one of ordinary skill in the art, at the time the invention was made to have a reflectance 3% or less in order to suppress self oscillation.
11. **For claim 2**, Verdiell teaches an angle of 5° to 12° with the second axis in order to prevent optical feedback into the optical cavity (column 5, lines 8-20).
12. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine angle with the previous combination in order to prevent optical feedback.
13. **For claim 3**, Kato further teaches the window glass is arranged in the second state.
14. The combination does not teach the angle between the surface and the first axis is in the range from 1° to 1.6°.
15. However, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to set the angle between 1° to 1.6°, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering workable ranges only involves routine skill in the art.

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16. **For claim 4**, Asakura teaches the laser diode and the grating are arranged so that the laser diode supplies an S wave to the grating (column 1, lines 50-57).

17. **Fore claim 11**, The combination does not teach a reflectance of a first order diffracted beam of the grating is in the range from 10% to 30%.

18. However, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to set the angle from 10% to 30%, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges only involves routine skill in the art.

19. **Claims 5-6, and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Asakura, in view of Kato and Verdiell, and further in view of Mizuno et al., "100mW Kink-free Blue-violet Laser Diodes with Low Aspect Ratio," Proceeding of the 11<sup>th</sup> Sony Research Forum, 2001 (hereinafter referred to as Mizuno).

20. **For claim 5**, the previous combination does not teach the laser diode has an output power of at least 45 mW, and wherein when the laser diode emits a beam with an output power of 45 mW or less, a kink does not occur.

21. However, Mizuno does teach a semiconductor device has an output power of at least 45 mW, and wherein when the laser diode emits a beam with an output power of 45 mW or less, a kink does not occur (abstract).

22. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine the laser taught in Mizuno with the device of the previous combination in order to provide a blue single mode laser.

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23. **For claim 6**, Mizuno further teaches the laser diode is a laser diode, wherein side surfaces of a ridge of the laser diode are buried with two layers of an insulation film (figure 1) to suppress the kink and a stripe width  $W$  is  $1.6\text{ }\mu\text{m}$  or less (figure 6).

24. **For claim 12**, the previous combination does not teach the laser diode is a blue laser diode.

25. However, Mizuno does teach a blue laser diode (abstract).

26. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine the laser taught in Mizuno with the device of the previous combination in order to provide a blue single mode laser.

27. **Claims 8-10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Asakura, in view of Kato and Verdiell, and further in view Sidorin et al. US Patent 7,027,469 (hereinafter referred to as Sidorin).

28. **For claims 8-10**, the previous combination does not teach the details that the NA is between .3 and .7 or that the cavity length is 10 mm to 30 mm.

29. However, Sidorin teaches the cavity is 1 cm to 3 cm (column 17, lines 66-67) and the NA is .5 (column 12, line 33).

30. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine the lengths and NA in Sidorin with the previous combination as they are workable ranges known in the art.

31. **Claims 13-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Asakura, Kato, Mizuno, Verdiell, and Sidorin.

32. **For claim 13**, the arguments are applied as to claims 1, 4, 5, 8-9, and 11.

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- 33. **For claim 14**, Mizuno is further applied as in claim 12.
- 34. **For claim 15**, Verdiell is further applied as to claim 2.
- 35. **For claim 16**, Kato is further applied as to claim 3.
- 36. **For claim 17**, Mizuno is further applied as to claim 6.
- 37. **For claim 18**, Sidorin is further applied as to claim 10.

### ***Response to Arguments***

38. Applicant's arguments filed 10/21/2009 have been fully considered but they are not persuasive. The applicant argues on pages 7-10 that neither Asakura nor Kato teach limitation "wherein a reflectance of a beam emission surface of the laser diode is 3% or less for light received from outside the laser diode." While this is true, the limitation was amended into claim 1 to include the previous limitation of claim 7, and the rejection of claim 1 has, therefore, incorporated Verdiell which was previously used in the rejection of claim 7. On page 11, regarding claim 1, the applicant argues that reflection is a directional property that is a function of the incident direction. While this statement may be true in the sense that light incident from the right is reflected to the right and light incident from the left is reflected to the left, it is not true as it relates to the percentage of reflection. For instance, it is well known that the reflectance at an interface is  $[n_1 - n_2 / (n_1 + n_2)]^2$  where  $n_1$  and  $n_2$  are the index of refraction of the two interfaces, and for a multilayer interference coating the reflectance is dependent on the thickness of the multilayer film to generate destructive interference in the reflected beams. Therefore, it does not matter that Verdiell explicitly teaches "[i]nternal reflection from the AR exit facet" Rather than the reflection for light received from outside the laser

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diode since light from outside the laser diode will demonstrate similar reflective properties. Further, it is clear from the external cavity structure that light will be received from outside the diode due to the reflection of the grating.

39. The applicant argues the rejection of claim 13 based on similar reasons to those provide for claim one, and the examiners response ids the same. Further, claim 13 does not include the limitation wherein the reflection is for light received from the outside, so the directional argument does not apply to the claim language of claim 13.

40. The remaining claims are argued based on their dependency on independent claims 1 and 13 and are, therefore, not further addressed.

### ***Conclusion***

41. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

42. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

43. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Carter whose telephone number is (571) 270-1872. The examiner can normally be reached on Monday-Friday, 7:00 a.m.-4:30 p.m., EST.

44. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

45. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MC/

/Minsun Harvey/

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Supervisory Patent Examiner, Art Unit 2828